at the Collège de France. In the following year he was elected a member of the Paris Academy of Sciences, where he took the place vacated by M. Ditte.

His numerous contributions to organic chemistry include the study of the chlorine and nitro-derivatives of benzene and aniline, of which he prepared a large number; but, not content with the mere preparation of new compounds, he sought to discover the relation existing between their physical properties and constitution. He succeeded in showing that there exists a definite relation between the number of substituting atoms and their melting points, boiling points, density, and molecular weight. These results served to some extent as the basis of Kekulé's theory.

Another series of memoirs was devoted to the examination of substances exhibiting molecular asymmetry, and Jungfleisch was able to show that the different forms of tartaric acid discovered by Pasteur, when heated with water, are transformed into one another, yielding an equilibrium mixture varying with the conditions of the experiment. For these researches he was awarded, in 1872, the Jecker prize of the Academy of Sciences. Up to this time no compound possessing molecular asymmetry had been prepared artificially, and it appeared that the intervention of a vital force, as Pasteur held, was necessary to produce it. Perkin and Duppa had succeeded in converting natural succinic acid into racemic acid. Jungfleisch completed the synthesis by converting ethylene, according to the method of Maxwell Simpson, into succinic acid. He also showed that camphoric acid exists in four isomeric forms, the so-called dextro- and lævo-camphoric and *iso*-camphoric acids which he isolated. Following up a similar line of research, he succeeded in resolving inactive malic and lactic acids into their active forms.

Among his other numerous memoirs may be mentioned his work on acetylene chlorides, a new method of reduction of organic compounds by tin salts, a research on derivatives of thymol, on lævulose, which he prepared in the crystalline state, on inulin, chloral hydrate, phenylphosphoric ether, etc.

Jungfleisch collaborated with Berthelot in the study of the partition coefficient of a substance in presence of several solvents; he assisted Lecoq de Boisbaudran in isolating gallium in quantity, and applied similar methods to the preparation of indium.

One of his latest contributions to chemistry was the study of gutta-percha, which resulted in the valuable discovery that the leaves of the plant can be used as a source of the material more economically and less destructively than the stem.

Of his literary contributions to the science mention should be made of the *Journal de Pharmacie et de Chimie,* to which he contributed for twenty-two years a review of foreign researches and publications, and successive editions of his well-known "Traité de Chimie Organique."

J. B. C.

NOTES.

The Government has appointed a Committee to recommend the steps to be taken for the relief of Sir Ernest Shackleton's Antarctic Expedition. The chairman is Admiral Sir Lewis Beaumont, G.C.B.; the other members are the hydrographer of the Navy, Major Leonard Darwin (representing the Royal Geographical Society), Sir Douglas Mawson, Dr. W. S. Bruce (who has intimate personal knowledge of the Weddell Sea area), and representatives of the Treasury, Board of Trade, and of Sir Ernest Shackleton. The Committee has already begun its meetings.

Universal sympathy will be felt with Sir William Crookes, who has suffered the heaviest of all bereavements by the death of his wife on May 10. Lady Crookes, whose maiden name was Ellen Humphrey, was born on January 31, 1836, and was therefore in her eighty-first year. She was married to Sir William on April 10, 1856, and from the earliest times took the liveliest interest in his scientific work, helping him, amongst other things, in delicate chemical weighings and the working out of the calculations connected therewith. Her devotion to, and interest in, his work formed a great incentive, and in no small degree contributed to his successful efforts in research. Theirs was the first private house in England in which electric light was introduced, and Lady Crookes helped her husband greatly in carrying out the installation and designing the ornamental work. She was a familiar and ever-welcome figure at scientific gatherings, to which she frequently accompanied her husband, and was able to be present with him at the reception given after his election as president of the Royal Society in the year 1913. Sir William and Lady Crookes celebrated their golden wedding in 1906, when they were able to welcome a large number of their friends and acquaintances, and were also the recipients of letters and telegrams of congratulation from all parts of the world. Lady Crookes was spared to celebrate quietly with her husband last month the almost unique event of a diamond wedding, but she was then in failing health, and passed away peacefully on May 10. Several sons and a daughter survive her.

The first meeting of the Standing Committee on Metallurgy appointed by the Advisory Council for Scientific and Industrial Research was held on Monday, May 8, at the offices of the Board of Education. The committee consists as to one-half of members nominated by the professional societies concerned, the other half being appointed direct by the Advisory Council, and it has been constituted with a view to the representation of both the scientific and the industrial sides of the industries. It consists of the following members:—Prof. J. O. Arnold, Mr. Arthur Balfour, Prof. H. C. H. Carpenter, Dr. C. H. Desch, Sir Robert Hadfield, Mr. F. W. Harbord, Mr. J. Rossiter Hoyle, Prof. Huntington, Mr. W. Murray Morrison, Sir Gerard Muntz, Bt., Mr. G. Ritchie, Dr. J. E. Stead, Mr. H. L. Sulman, and Mr. F. Tomlinson. Sir Gerard Muntz is the chairman of the full committee and of the Non-ferrous Sub-Committee, and Sir Robert Hadfield is the chairman of the Ferrous Sub-Committee. The committee was welcomed by Sir William M'Cormick, administrative chairman of the Advisory Council, and Dr. Heath, administrative secretary to the Council. Sir A. Selby-Bigge also attended, and gave an account of the genesis of the movement, and emphasised the importance which the Government attaches to the establishment of close relations between education, research, and industry. The committee then proceeded to consider various matters of fundamental importance in regard to policy and procedure. Afterwards the two sub-committees met and formulated their lines of policy, after which they passed to the consideration of various applications for financial aid in connection with contemplated researches of industrial importance. Grants in aid have already been made by the Advisory Council towards the cost of carrying out certain metallurgical researches.

PROF. HENRI LECOMTE, Prof. Edmond Perrier, and Prof. Pier' Andrea Saccardo have been elected foreign members of the Linnean Society.

DR. R. HAMLYN-HARRIS, director of the Queensland Museum, has been elected president of the Royal Society of Queensland for the year 1916–17.

THE Bakerian Lecture of the Royal Society will be delivered on Thursday next, May 25, by Prof. C. G. Barkla, on "X-rays and the Theory of Radiation."

THE twenty-first annual congress of the South-Eastern Union of Scientific Societies will be held at Tunbridge Wells on May 24–27. The retiring president is Dr. J. S. Haldane, and the president-elect the Rev. T. R. R. Stebbing.

WE regret to announce the death of Prof. H. C. Jones, professor of physical chemistry in Johns Hopkins University, and author of many books and papers on inorganic and physical chemistry.

AN extraordinary general meeting of the Chemical Society was held at Burlington House on May 11, to consider the question of the removal of the names of nine alien enemies from the list of honorary and foreign members of the society. No decision was reached, and the meeting was adjourned.

DURING recent excavations in Kent's Cavern, Torquay, the proprietor, Mr. W. F. Powe, has obtained a molar tooth of a nearly adult mammoth (*Elephas primigenius*). In the Pleistocene hyæna dens as a rule the remains only of young individuals of the mammoth occur, the smaller animals having been the more easy prey. The accumulated bones and teeth in Kent's Cavern were introduced at different times, both by hyænas and by man.

DR. C. A. CATLIN, who died recently at Providence, Rhode Island, had been chemist to the Rumford Works in that city for forty years, and was widely known as the inventor of various chemical processes and applications, many of which relate to the manufacture of phosphates for dietetic purposes. He was born at Burlington, Vermont, in 1849, and graduated in 1872 at the University of Vermont, which conferred on him in 1913 the honorary degree of Sc.D.

DR. C. A. DAVIS, one of the foremost American authorities on peat, died last month in Washington at the age of sixty-four. After graduating at Bowdoin College, Maine, in 1886, he spent several years as a teacher of science in various schools and universities. Since 1907 he had been employed by the U.S. Government as a peat expert, in connection first with the Geological Survey and afterwards with the Bureau of Mines. He was editor of the Journal of the American Peat Society, and author of "Peat in Michigan" and "The Use of Peat for Fuel."

THE control of the Imperial Institute will, by the new Act which has recently passed through both Houses of Parliament (see NATURE, April 27, p. 184), rest with the Colonial Office. By the establishment of an Executive Council a board of management will be created, which, subject to the control of the Colonial Office, will be responsible for the operations of the institute. The relationship between the Colonial Office and the institute will thus be analogous to that between the Colonial Office and a Crown Colony. Matters of important policy will have first to receive the sanction of the Colonial Office, but, subject to this, the Executive Council will possess a general executive authority.

IT has long been known that cats may be carriers of diphtheria and transmit the disease to human beings. A notable instance of this is recorded in the *National Medical Journal*. An outbreak of diphtheria occurred in an orphanage, and of seventy-one cases sixty-nine occurred on the boys' side. Sanitary defects and contamination of water and food were eliminated. Attention was then directed to the cats in the establishment, and on bacteriological examination it was found that four cats on the boys' side harboured the diphtheria bacillus, but the animals on the girls' side were free from infection. The cats were destroyed, and after this only ten more cases of diphtheria occurred, and these within a few days, showing that infection had taken place before the destruction of the cats. No further cases developed.

A NOTE in the *Times* of May 11 states that at the monthly meeting of the Central Executive Committee of the Employers' Parliamentary Association a resolution was passed urging the necessity (1) of increasing the number of chemists trained in research work, and (2) of making special effort to enlist the co-operation of manufacturers who hitherto have been lamentably apathetic in regard to scientific industrial research and training. The resolution was brought forward in connection with the consideration of the report of the sub-committee of the Advisory Committee to the Board of Trade on Commercial Intelligence, with respect to the measures for securing after the war the position of certain branches of British industry.

THE fourteenth annual session of the South African Association for the Advancement of Science will be held at Maritzburg on July 3–8 inclusive, under the presidency of Prof. L. Crawford, professor of mathematics, South African College, Cape Town. The sections, with their presidents, will be as follows:—A (Astronomy, Mathematics, Physics, Meteorology, Geodesy, Surveying, Engineering, Architecture, and Irrigation), Prof. J. Orr; B (Chemistry, Geology, Metallurgy, Mineralogy, and Geography), Prof. J. A. Wilkinson; C (Bacteriology, Botany, Zoology, Agriculture, Forestry, Physiology, Hygiene, and Sanitary Science), Mr. I. B. Pole Evans; D (Anthropology, Ethnology, Education, History, Mental Science, Philology, Political Economy, Sociology, and Statistics), Mr. M. S. Evans.

THE Illuminating Engineering Society, in common with other scientific and technical institutions, has been considering the encouragement of researches of special utility at the present time, and at the annual meeting, at which Prof. Silvanus P. Thompson presided, a report on the subject was presented by the Committee on Research. A number of problems are mentioned which will receive attention, in order of urgency, at the hands of the committee. Among these are included researches on the qualities of glassware required for illuminating purposes, the study of lighting appliances (globes, shades, reflectors, etc.), and the investigation of the conditions of illumination required for various industrial processes. Attention is also directed to the need for a series of standard colours of specified tint and reflecting value, the standardisation of so-called "artificial daylight," and the prescription of a standard method of testing the permanence of colours, all of which are of considerable interest in relation to the dyeing and colouring trades. The list includes thirty distinct sections, and it is evident that the study of all these subjects would provide work for many years to come.

FLINT implements of the Neolithic type are fairly common in the Gold Coast Colony, but up to the present examples of the Palæolithic age have been wanting. In 1914 some rough quartzite stones of Palæolithic character were picked up on the coast at Accra. Mr. F. W. Migeod, in *Man* for April, announces the discovery of a rude implement in North Ashanti. It was found in a road cutting not far from the surface. The material seems to be a kind of chert, and Mr. Migeod is not disposed to attribute any great antiquity to it. He suggests that it was chipped experimentally, and was used for some temporary purpose. This supposition is confirmed by the character of the material, which is of a soft nature, and the implement would scarcely stand much rough use without losing its edge. Even if this specimen proves to be comparatively modern, it is still interesting as marking the survival of the Palæolithic type of implement in the Neolithic period.

DR. J. H. ASHWORTH contributes a brief note on the hibernation of flies to the *Scottish Naturalist* for April, describing the results of an inspection of a house in Edinburgh during February last, certain rooms of which, facing south, were harbouring swarms of flies. These had evidently been hibernating behind pictures and furniture during the winter, and had been roused into activity with the return of sustained sunshine. Though still lethargic, they had crawled from their hiding-places, where many were still found, to bask in the sun streaming through the windows. In all, five species were found, mostly females; but neither house-flies nor bluebottles were met with among them. An examination of the spermathecæ revealed living spermatozoa, showing that impregnation must have taken place during the autumn, when apparently the males for the most part die.

MR. C. TATE REGAN, in his memoir on "Larval and Post-larval Fishes," published by the trustees of the British Museum as part of the official "Report on the Results of the British Antarctic (*Terra Nova*) Expedition, 1910," has accomplished a peculiarly difficult task with conspicuous success. A wide knowledge of ichthyology, and a capacity for laborious work, are apparent everywhere. But these pages owe their value not so much to the number of species which have been determined as to the insight displayed into puzzling ontogenetic changes, and the lucid interpretation he has given in regard to problems of geographical distribution, migration, and the evolution of curious structural peculiarities which disappear with larval life. Among the latter, perhaps the most extraordinary is that furnished by the post-larval stage of a Stylophthalmid, of which a figure is given. Herein the terminal portion of the gut hangs down from the body after the fashion of the rope trailed from a balloon. A special cartilaginous support is developed at the base of this trailing portion. The function of this remarkable development seems to be that of a balancer. This, however, is but one of many structural adaptations peculiar to larval life discussed by Mr. Regan in the course of his "Notes and Conclusions," wherein he summarises the results of his investigations.

A NEW part of the *Palaeontologia Indica* (new series, vol. vi., No. 1) is devoted to a description of additional Ordovician and Silurian fossils from the northern Shan States of Burma, by Dr. F. R. Cowper Reed, with twelve plates of beautiful drawings by Mr. T. A. Brock. Although many of the Ordovician species are new, they are clearly more closely related to the northern European than to the American forms. They are also sufficient to show that the rocks from which they were obtained may be assigned to the lower part of the Ordovician series. Among the Silurian fossils are many interesting Graptolites, which Miss G. L. Elles refers to well-known species of the European Llandovery horizon. A few Graptolites from one locality also seem to agree with those from the base of the Wenlock Shales. Various fossils prove that the Upper Silurian is represented in at least two stages corresponding with the European Wenlock and Lower Ludlow. There also seem to be some marine formations transitional to the Devonian, but more evidence is needed to determine their exact relationships.

A PAPER was read on April 18 before the Institution of Petroleum Technologists, by Mr. E. H. Cunningham Craig, upon the Kerogen-shales, or Scottish oil-shales, in which the author advances some novel theories upon the origin of these oil-shales. He points out that a marked characteristic of strata yielding oil by distillation is to be found in the small irregular yellow masses, which have been discovered in most of these deposits by microscopic examination. These were first held to be gelatinous algæ, and were afterwards described by Prof. E. C. Jeffery as spores of vascular cryptogams. The author has come to the conclusion that they are not vegetable fossils at all, but are small masses of inspissated petroleum. According to this view, the rocks that are now oil-shales were originally argillaceous beds sufficiently colloidal to be able to absorb the necessary quantity of inspissated petroleum from the porous petroliferous sandstones with which they were associated. Such action is only possible in anticlinal areas where the petroliferous rocks come to the surface and are subject to the influence of weathering. Thus the decrease in the yield of oil down the flanks of anticlines is successfully accounted for. The author suggests that his theory affords valuable information in selecting a site for boring for oil-shales.

WE have received from Dr. N. O. Holst a reprint of his articles on the Ice age in England from the *Geological Magazine*, September–November, 1915. It is an interesting summary of the conclusions of one who has had long and varied experience of the Glacial deposits of Scandinavia and other parts of northern Europe, besides those of the British Isles, and emphasises the differences of opinion that still exist among geologists who have deeply studied the evidence of Pleistocene glaciation in this part of the world. Dr. Holst agrees with those who maintain that there was only one continuous Glacial period, and thinks there is still no proof in northern Europe of the alternation of cold and warm episodes which have been recognised and named by Penck in the Alps. He regards the high-level gravels in the valley of the Thames at Swanscombe, Grays, Ilford, Erith, and Crayford as pre-Glacial, and points out "how one warmth-loving mollusc after the other disappears from the Thames valley in proportion as the inland ice approaches." The associated flint implements at Crayford are described as oldest Mousterian. The Arctic bed at Ponder's End follows, and the well-known Thames brick-earth is truly Glacial, "belonging to the period of the melting of the inland ice." After much discussion, Dr. Holst concludes that the Ice age persisted continuously from Mousterian times, though not from their first beginning, to the close of the Magdalenian stage, and remarks that it can be followed among British deposits from the beginning to the end. We commend his work to the notice of those who are interested in Palæolithic man and the associated mammals.

The annual volume of "Records of the Survey in India" (vol. vii.) for 1913–14 has recently been published, and is a summary of an immense amount of useful work carried out under the supervision of the Surveyor-General of India, Sir S. G. Burrard. Apart from the details of the trigonometrical and geodetic operations, one of the most interesting chapters deals with the exploration of the north-east frontier. This work was done by Capts. Bailey and Morshead in 1913, and by the Abor exploration party in 1911–12–13. Up to that time almost the sole authority for the Abor country was Kinthup, who explored the course of the Tsan-po through the Himalayan Range in 1880–83. Kinthup, who was sold into slavery by his master, a Chinese lama, had been widely discredited, but in this report Capt. G. F. T. Oakes, in a critical discussion of his work, proves its trustworthiness.

The report on the state of ice in the Arctic Seas for 1915 has made its appearance (*Det Danske Meteorologiske Institut, Kjobenhavn*). There are charts for April, May, June, July, and August, with full explanations of the data gathered from all available sources. The publication is printed in Danish and English in parallel columns. Most interesting are the abnormal ice conditions that prevailed in Spitsbergen waters. As early as May there were symptoms of an unusually bad season. In June the pack extended far to the westward, and there was no approach to the fjords. In July the belt of pack narrowed a little, but even in August it was lying all along the west coast. More remarkable still was the extension of this belt of pack, throughout the summer, well to the north of Prince Charles Foreland—an occurrence altogether exceptional. It is suggested by Commander Speerschneider, the author of the report, that some of the Greenland ice had drifted eastward to Spitsbergen waters, and mixed with the ice that normally sweeps round South Cape from the Barents Sea. Certainly in 1907 Greenland pack reached to 8° E. in the latitude of Ice Fjord, Spitsbergen, which is within the limits of the space covered last year by the pack under discussion. This explanation would also account for the northward extension of the ice. Off the north coast of Iceland ice conditions were bad until the end of July, which is again an abnormal state of affairs.

A good instance of the high appreciation by scientific Americans of the circulars issued from time to time by the Bureau of Standards at Washington is provided by the recent issue by the Bureau of a *third* edition of the circular on magnetic testing of materials. It covers fifty pages, and is issued at 15 cents a copy by the Government Printing Office at Washington. It deals with the methods of measurement in use at the Bureau, the results obtained with typical commercial magnetic materials, and gives a great deal of general information on magnetic subjects. Induction and hysteresis data for straight bars are obtained by the Burrows form of permeameter, in which the bar under test is combined by means of two soft iron yokes with an auxiliary bar to form the magnetic circuit. Core loss determinations are made according to the specifications of the American Society for Testing Materials on strips 5 by 25 cm., cut half along, half across, the direction of rolling. They are assembled in four equal bundles, and with four corner pieces constitute the magnetic circuit. The measurements are made by means of the ballistic galvanometer in each case. A number of hysteresis curves for typical materials and a table of magnetic susceptibilities of chemical elements and compounds are given.

In two papers published in the Journal of the Society of Chemical Industry (vol. xxxv., No. 4) Mr. G. S. Robertson discusses the question of the availability of the phosphates in basic slags and mineral phosphates. The increasing demand for phosphatic fertilisers is leading to a search for substances previously considered of little value for this purpose. The value of 2 per cent. citric acid as a solvent for testing the availability of phosphates has been challenged for minerals and fluorspar slags. On account of the low solubility of these phosphatic materials in this solvent it has often been assumed that they are not so valuable as the high-grade basic slags; indeed, Wagner introduced this test to detect the adulteration of basic slag with rock phosphate. Mr. Robertson shows that a sufficient number of extractions dissolve out quite as much phosphoric acid from the minerals as from the slags. The fineness of grinding is also an important factor in the solubility of rock phosphates. Field results at various English centres and in the United States have shown the high value of rock phosphates, and the author concludes that the citric test is worthless as a measure of the relative values of phosphatic fertilisers.

It has usually been assumed that the wear of coins in circulation is due entirely to abrasion. In a memorandum by Sir T. K. Rose, however, contributed to the forty-fifth annual report of the Deputy-Master of the Mint, attention is directed to the effect of grease, derived from the sweat of the fingers or from other sources, in accelerating the wear of coins. The fatty acids of the grease have a corrosive action upon the metal. Copper, in particular, even if present only in small quantity alloyed with gold or silver, is converted into an oleate, stearate, or other salt. Haagen Smit, of the Utrecht Mint, found by analysis that the dirt on a bronze coin contained 36 per cent. of copper in the form of pulverulent compounds of the fatty acids. When the coin is handled the dirt is in part detached, and the coin undergoes a rapid loss of weight. Gold or silver is not readily converted into salts, but the removal of the alloying copper leaves the less easily attacked metals in a spongy form which offers little resistance to abrasion. A surface layer of pure silver at first preserves coins from chemical attack, but this layer is soon removed by mechanical wear. In new coins the rapid loss of weight which occurs is doubtless due at first to abrasion, but when the rough edges have been removed chemical action may prove to be of the first importance in the succeeding deterioration.

In vol. xv. (part i.) of the Transactions of the English Ceramic Society the feature of most scientific interest is a series of three "Studies on Flint and Quartz," by Dr. J. W. Mellor and two collaborators. The first paper describes the effects upon quartz and flint of heating these substances at temperatures obtained in pottery ovens. It has long been known that quartz on calcination or fusion shows a notable decrease in specific gravity—a change which is presumably attributable to the conversion of the quartz molecule to a lower degree of polymerisation. Flint, it is found, undergoes similarly an alteration of specific gravity when calcined, but much more rapidly than quartz. Between grey flint and black flint there is likewise a difference in the rapidity of transformation to the form of lower density, grey flint being changed somewhat more quickly than the black variety. The practical bearing on certain ceramic operations of these differences of behaviour is pointed out. In the second paper there is an interesting account of the formation and distribution of boulder and chalky flints; and in the third the question of substituting other forms of silica for flint in pottery manufacture is discussed. A timely article upon the national importance of fuel economy is contributed by Prof. W. A. Bone.

Several numbers of the Technologic Papers issued by the United States Bureau of Standards have recently come to hand. Each deals with a special problem of analytical chemistry which has been investigated by the departmental chemists. In No. 64 a new method is given for the determination of barium carbonate in vulcanised-rubber articles, and it is shown that the process is sufficiently accurate for use in the somewhat difficult case where sulphates of lead and barium are present simultaneously with the barium carbonate. Paper No. 65 includes a scheme for the determination of oil and resin in varnishes; tested upon samples of known composition, the process has given fairly good results. A method for the detection of resin in driers is developed in No. 66. It appears to be trustworthy except when the proportion of resin is very small. Analytical chemists who may have to deal with gums will find in paper No. 67 a useful summary of the chemistry of gum arabic. The authors of the paper find that basic lead acetate gives the most characteristic reaction for this gum, whilst for its quantitative determination they have devised an improved process, depending upon the precipitation of the gum with an alcoholic solution of copper acetate. Paper No. 69 describes a critical study of the determination of carbon in steel by direct combustion in oxygen at temperatures higher than are ordinarily employed. Although the new method gives good results, the investigators consider that the experimental difficulties place it beyond the reach of most industrial and works laboratories.

The following works are in preparation for appearance in Messrs. Longmans and Co.'s *Monographs on Biochemistry* :—"The Development and Present Condition of Biological Chemistry," Dr. F. Gowland Hopkins; "The Polysaccharides," A. R. Ling; "Colloids," W. B. Hardy; "Physical Methods used in Biological Chemistry," Dr. G. S. Walpole; "Protamines and Histones," Dr. A. Kossel; "Lecithin and Allied Substances," Dr. H. Maclean; "The Ornamental Plant Pigments," A. G. Perkin; "Chlorophyll and Hæmoglobin," H. J. Page; and "Organic Compounds of Arsenic and Antimony" Dr. G. T. Morgan.

Messrs. Macmillan and Co.'s list of forthcoming books includes the following :—"A Bibliography of British Ornithology, from the Earliest Times to the End of 1912, including Biographical Accounts of the Principal Writers and Bibliographies of their Published Works," by W. H. Mullens and H. Kirke Swann, in six parts, the first of which will be issued at the beginning of June; "Discovery, or the Spirit and Service of Science," by Prof. R. A. Gregory, illustrated (The purpose of the work is to display the nobility of scientific endeavour, the meaning and value of scientific method, and the practical service of results obtained by research); "Theoretical Chemistry," by Prof. W. Nernst, new edition, revised by H. T. Tizard; "A Manual of Practical Physics," by H. E. Hadley; "Elements of Geometry," by S. Barnard and J. M. Child, parts v. and vi.; "Second Thoughts of an Economist," by the late Prof. W. Smart, with a biographical sketch by T. Jones; "The Military Map: Elements of Modern Topography (French School of War)"; "The Statesman's Year Book, 1916," edited by Dr. J. Scott Keltie, assisted by Dr. M. Epstein.

OUR ASTRONOMICAL COLUMN.

Stereoscopic Spectroheliograms.—A remarkable pair of photographs of hydrogen (H_α) flocculi, showing a stereoscopic effect, have been forwarded to us by Prof. Hale. They were taken with a new grating spectroheliograph, used in conjunction with the 60 ft. tower telescope at Mt. Wilson, and exhibit the flocculi surrounding a large spot-group near the sun's west limb on August 7, 1915. The time interval between the two exposures was seven minutes, giving a separation of the two images due to the sun's rotation somewhat greater than Helmholtz's estimate of 1 for the minimum angular separation of two objects just sufficing for stereoscopic vision. The photographs show the structure of the flocculi in a way which at once recalls Langley's well-known representation of the minute details of the photosphere about a spot; and a long, dark flocculus, which afterwards appeared as a prominence on the west limb, is distinctly seen in relief. Photographs of this kind must necessarily be affected by changes in the actual details in the interval between the exposures, and by distortion arising from drift of the solar image, or from irregular motion of the spectroheliograph, during exposure; but Prof. Hale believes that with due precautions the stereograms will assist in clearing up some of the questions referring to relative levels. A check on the reality of the stereoscopic relief has been obtained by taking photographs of a globe having a roughened surface, turned through angles corresponding with the intervals between the solar photographs.

A Variation in the Solar Rotation.—In the programme of spectroscopic work at the Ottawa Observatory a considerable place is devoted to the investigation of the solar rotation. In the most recent publication Mr. H. H. Plaskett gives an account of a special inquiry regarding its variability in time (*Astrophysical Journal*, vol. xliii., No. 2). In order to regularise the personal equation and avoid bias all measurement was postponed until the desired series of spectra had been secured; the plates were then mixed, divided into two bundles, and measured with two quite different types of machines. The displacements of eight lines, including three of telluric origin, to serve as a check on possible instrumental displacements, were measured. Three possible modes of variation were looked for: (1) diurnal; (2) short period; and (3) secular changes. The evidence indicates that daily variations, if existent, do not reach 0·1 km.; variations of the second and third types are revealed in a cyclic change of 0·15 km. with a period of about a month, and a diminution of rotational velocity amounting to 0·04 km. since 1913. The research is a typical example of the thoroughness already traditional at Ottawa.

The Great Meridian Circle of the Paris Observatory.—The annual reports of the Paris Observatory for the last two years contain some interesting facts concerning the working of this instrument. After accidental damages the indications of the repaired level were discordant, so that throughout the past twelve months the determinations of inclination of the axis have been entirely made by nadir observations, employing the suspended mercury bath devised by M. Hamy. Another modification of procedure concerns the collimation error. It was found that when the usual daily determinations were employed the resulting clock rates showed variations greater than could be expected. Consequently use is now made of a weighted mean value of the collimation error determined by observations of circumpolar stars at upper and lower culminations.